Notice of Allowability	Application No.	Applicant(s)	
	09/894,870	BUTLER ET AL.	
	Examiner	Art Unit	
	Kandasamy Thangavelu	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *May 23, 2005 and September 2, 2005*.

2. ☒ The allowed claim(s) is/are *1-11,13-19 and 21*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 11/12/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other *See Continuation Sheet*.

Continuation of Attachment(s) 9. Other: Clean copy of allowed claims.

DETAILED ACTION

Introduction

1. This communication is in response to the Applicants' communication dated May 23, 2005 and September 2, 2005. Claims 1-21 were amended. Claims 22-58 were withdrawn. Claims 1-21 of the application are pending.

Substitute Specification

2. The substitute specification mailed on September 2, 2005 has been accepted and entered.

Examiner's Amendment

3. Authorization for this examiner's amendment was given in a telephone conversation by Mr. Neil Batevia on October 25, 2005.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

4. In the specification:

Page 1, Line 25, "monopole and sleeve helix, units."

has been changed to

-- monopole and sleeve helix units.--

Page 3, Lines 9-10, "of designs upon which specified selection by limiting the genetic algorithm ultimate identifies the optimum design(s)"

has been changed to

-- of designs upon which a specified selection by the genetic algorithm ultimately identifies the optimum design(s)--

Page 3, Line 15, "characterized generally as broad band and omni directional"

has been changed to

-- characterized generally as broadband and omnidirectional --

Page 4, Line 4, "for omni-directional, wide band antennas"

has been changed to

-- for omni-directional, wideband antennas --

Page 19, Line 2, "cage structures can be optimizes for lower VSWR"

has been changed to

-- cage structures can be optimized for lower VSWR --

5 In the claims:

In amended Claim 1, Lines 3-7, "providing at least one design parameter for a driven antenna structure as input to an algorithmic process;

executing said algorithmic process to determine size and position of parasitic elements for combination with said driven antenna structure to create improved antenna configurations; and"

has been changed to

-- providing at least one design parameter for a driven antenna structure as input to an algorithmic process, comprising a genetic algorithm;

executing said algorithmic process to determine size and position of parasitic elements for combination with said driven antenna structure to create improved antenna configurations, characterized by a central antenna portion surrounded by a plurality of parasitic elements forming a sleeve configuration; and--.

In amended Claim 4, Lines 2-4, "wherein said algorithm process includes calculating the voltage standing wave ratio for selected of said antenna configurations over a selected range of frequencies for antenna operation"

has been changed to

-- wherein said algorithm process includes calculating voltage standing wave ratios for selected of said antenna configurations over a selected range of frequencies for antenna operation

and assigning fitness values to said antenna configurations for which the voltage standing wave ratios are less than some predetermined value--.

Replace Claim 9 with:

9. A method for designing a sleeve antenna structure characterized by omni-directional capabilities over a generally wide frequency range, comprising:

defining initial antenna parameters and providing a corresponding range of potential values for selected of said initial antenna parameters;

executing a first iteration of an algorithmic process, comprising a genetic algorithm to generate a population of individual antenna designs, characterized by a central antenna portion surrounded by a plurality of parasitic elements such that selected individual antenna designs of said population of individual antenna designs are assigned fitness values that relate to a bandwidth ratio of the highest frequency to lowest frequency within a selected frequency range of operation for which voltage standing wave ratios are less than some predetermined value;

evaluating said population of individual antenna designs and selecting certain of said individual antenna designs as having optimum fitness values; and

executing at least a second iteration of said algorithmic process to generate an additional population of individual antenna designs with corresponding fitness values assigned to selected individual antenna designs of said additional population.

In claim 12:

Cancel claim 12.

Replace Claim 15 with:

15. A process for designing and producing antennas, comprising the steps of:

providing a genetic algorithm as a design algorithm;

providing general antenna parameters and a corresponding range of potential values for selected of said general antenna parameters for input to said design algorithm;

specifying the resolution of selected of said general antenna parameters;

performing a first iteration of said design algorithm to generate a population of individual antenna designs, wherein selected of said individual antenna designs are characterized as having a sleeve configuration with a central antenna portion surrounded by a plurality of parasitic element, and wherein each individual antenna of said population of individual antenna designs is assigned a fitness value;

evaluating said fitness values of selected of said individual antenna designs to determine which of said antenna designs are characterized by optimum fitness values;

performing at least a second iteration of said design algorithm to generate an additional population of individual antenna designs, wherein selected of said individual antenna designs are identified as having most optimum fitness values; and

providing an antenna having parameters corresponding to those of a selected individual antenna design identified as having a most optimum fitness value.

In claim 20:

Cancel claim 20.

In claims 22-58:

Cancel claims 22-58.

A clean copy of the allowed claims is attached.

Reasons for Allowance

6. Claims 1-11, 13-19 and 21 of the application are allowed over prior art of record.

7. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) a method of designing loaded wire antennas with broadband characteristics using a two-step design procedure; in the first step, different unloaded antenna configurations are examined to identify configurations with lowest voltage standing wave ratio and highest gain characteristics; multi-arm antennas with straight wire segments that branch off symmetrically from a central stem are found to be best candidates; next, an antenna with the best performance is loaded with resonant tank circuits and a matching network is designed; the loads enhance the antenna with higher gain and lower VSWR by modifying the current distribution and provide omnidirectional radiation pattern in the azimuth plane; an efficient optimization procedure based on the genetic algorithm is used to simultaneously determine the load components, their

locations and the parameters of the matching network (**Altman et al.,** "New designs of Ultra wideband communication antennas using a genetic algorithm", IEEE, October 1997);

(2) an antenna device comprised of dielectric elements, the device having an array of parasitic director elements, which coherently focuses energy across the parasitic array; the parasitic elements form a lens which provides the directionality of the antenna; the antenna is a high gain array, where most elements are fed parasitically from one or more driven elements; the parasitic elements are arranged on a substrate; the electrical coupling between the parasitic elements functions as a lens to focus the energy across the array; directionality is achieved through the arrangement of the driver elements and is controlled through a simple switching system; a plurality of the feed elements are arranged in a circular pattern around a plurality of parasitic elements; the parasitic elements refract the energy across the lens in a desired direction according to feed and reflector elements that have been activated (**de Schweinitz et al.,** U.S. Patent 6,317,092); and

(3) a broadband patch antenna with multiple patches that are directly fed; patched array antennas comprise separate antenna elements which are excited directly or parasitically at different phases with respect to each other; broadbanding is achieved by combining the bandwidths of two individual antenna elements; the band overlapping is done by direct feeding of one element at one resonant frequency and having another parasitic element resonating at a nearby frequency; additional parasitic patches can be added to make the antenna more broadband; the practical limit of the number of antenna elements , some being parasitically fed , involved in broadband antennas with closely spaced elements is three (**Josypenko,** U.S. Patent 6,118,406).

Additional state of the art reviewed and considered by the Examiner is found in U.S. Patent 6,034,648; U.S. Patent 6,765,541; U.S. Patent 6,639,555; U.S. Patent 6,624,794; U.S. Patent 6,606,051; U.S. Patent 6,424,309; U.S. Patent 6,344,833; U.S. Patent 6,320,550; U.S. Patent 6,249,256; U.S. Patent 6,222,494; U.S. Patent 6,173,191; U.S. Patent 6,169,523; U.S. Patent 3,790,943; U.S. Patent Application 2003/0076276; U.S. Patent Application 2003/0103011; U.S. Patent 6,323,809.

None of these references taken either alone or in combination with the prior art of record discloses a method of designing omni-directional, broadband antennas, specifically including:

"executing said algorithmic process to determine size and position of parasitic elements for combination with said driven antenna structure to create improved antenna configurations, characterized by a central antenna portion surrounded by a plurality of parasitic elements forming a sleeve configuration; and

identifying selected of said improved antenna configurations as optimum configurations based on a determined fitness value for each improved antenna configuration".

None of these references taken either alone or in combination with the prior art of record discloses a method for designing a sleeve antenna structure characterized by omni-directional capabilities over a generally wide frequency range, specifically including:

"executing a first iteration of an algorithmic process, comprising a genetic algorithm to generate a population of individual antenna designs, characterized by a central antenna portion

surrounded by a plurality of parasitic elements such that selected individual antenna designs of said population of individual antenna designs are assigned fitness values that relate to a bandwidth ratio of the highest frequency to lowest frequency within a selected frequency range of operation for which voltage standing wave ratios are less than some predetermined value".

None of these references taken either alone or in combination with the prior art of record discloses a process for designing and producing antennas, specifically including:

"performing a first iteration of said design algorithm to generate a population of individual antenna designs, wherein selected of said individual antenna designs are characterized as having a sleeve configuration with a central antenna portion surrounded by a plurality of parasitic element, and wherein each individual antenna of said population of individual antenna designs is assigned a fitness value;

evaluating said fitness values of selected of said individual antenna designs to determine which of said antenna designs are characterized by optimum fitness values".

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is

571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard, can be reached on 571-272-3749. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Paul L. Rodriguez 10/28/05

Primary Examiner
Art Unit 2125

K. Thangavelu
Art Unit 2123
October 25, 2005